

## ===== WPI =====

TI - File system in information network - applies procedure name to file resources corresponding to virtual file name obtained by virtual file name solution point

AB - J08110869 The system is applicable to multiple computer system performing information processing, which are connected with a network. The file resources position information and the resources are processed. A communication part (11) receives demand of file name and read-out. A file name management part (2) requires file name, for operation. The solution of file name is demanded by this management part.

- Hence, it searches a virtual file resources management table (14). The communication part obtains procedure definition from a procedure management part (4) based on the procedure name. A procedure application part (6) is fed with the file's physical position. This part transmits the position information to a file reading/writing unit (5). The procedure is output through the communication part, according to procedure information.

- ADVANTAGE - Raises handling flexibility of file resources.

- (Dwg.1/15)

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PR - JP19940246351 19941012

PA - (XERF ) FUJI XEROX CO LTD

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## ===== PAJ =====

TI - FILE SYSTEM

AB - PURPOSE: To improve the flexibility of the handling of file resources by enabling access to a virtual file resource obtained by performing a specific procedure to an existent file resource.

- CONSTITUTION: When a communication part 1 receives a request to read out a file name, it requests a file name management part 2 to work out the file name, and requests a virtual file name management part 3 to work out the file name if the file name is not worked out. The virtual file name management part 3 retrieves a virtual file resource management table 14 and passes the physical position and procedure name of the file to the communication part 1. The communication part 1 obtains procedure definitions together with the physical position of the file and pass them to a procedure application part 6 together with the physical position of the file. The procedure application part 6 passes the physical position of the file to a file reading/writing part 5 and applies the procedure to the read information according to the procedure definitions, thereby outputting the information through the communication part 1.

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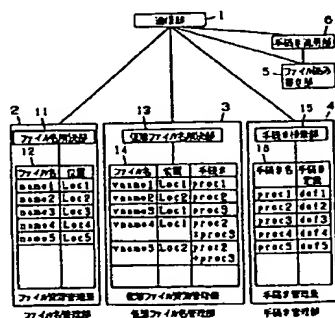
ABV - 199608

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] On a network, the resources of two or more computing systems which process information distribute, and are arranged, and this invention manages the physical position of the file resources corresponding to the identifier and identifier of file resources in the network information system with which two or more computing systems communicate mutually, and operate, and relates to the file system method which carries out the resolution to a position from an identifier.

[0002]

[Description of the Prior Art] As this conventional kind of a file resource-management method, the resource-management method of a clearing-house service of U.S. Xerox Corp. and the file service are stated to Akihiro Uetani work, a "Local Area Network Ethernet outline", the 2 edition of a revision, Maruzen Co., Ltd., and p.222-229. In this method, the attribute of an arbitrary individual is made to correspond to the identifier of the resources in a distributed system, it manages by the distributed database, and conversion to the address is offered from an identifier. With the clearing-house service, by using file ID, a directory and a local file name, and a pathname, a file is specified and the file service is realized.

[0003] As another file resource-management method, it is Maekawa. \*\*, place A truth male, spring water The resource-management method of GALAXY operating system is described by volume [ on \*\*\*\*\* ], and "thing which comes to degree of distributed operating system UNIX" joint establishment publication, and p.243-264. In this method, the logical identifier of an object and the positional information of the physical substance of an object are made to correspond, and it stores in a global-area-database and has managed. The positional information of all the duplicates of an object is recorded and managed in this resource-management method.

[0004] Moreover, in the name service system indicated by JP,63-236436,A, a control means to manage on a table the identifier of the information processor which is the resources on the identifier of an information processor and a network address, i.e., a network, and the network address which is the physical position is included. And the name service which searches a network address to the inquiry by the identifier from an information processor is offered.

[0005] In the management method of these conventional file resources, the physical positional information or physical attribute of the identifier and file resources of file resources is matched, it manages in a resource-management table or a resource-management database, and the physical positional information or physical attribute of the file resources which correspond from the inputted file name is outputted. In the management method or system of file resources on such a network usually used, the position of file resources is supposed in the meaning of hiding the physical position of a file. However, about the handling of file resources, it must carry out on the responsibility of application, and the file management which supposes the handling of a file in this meaning is not offered.

[0006] Especially, in the conventional system, in the imagination file resources (file resources 2) obtained as a result which applied data processing to a certain file resources (file resources 1), can give the imagination identifier (identifier 2) other than the identifier (identifier 1) of the file resources (file resources 1) of a basis, and it cannot be dealt with. For example, the imagination file resources (file resources 2) obtained as a result which applied data processing, such as type conversion and transform processing of an access protocol, to a certain resources (resources 1) are received. The imagination identifier (identifier 2) other than the file resources (file resources 1) of a basis cannot be given, and it cannot be dealt with as if the file resources (file resources 2) which have the imagination identifier (identifier 2) which can be accessed by the mold for which it asks, or the access protocol exist. In a prior art, the high network information system of the versatility in which such handling is possible is not offered. Furthermore, two or more procedure identifiers for dealing with file resources are managed, and the high network information system of the versatility which a unit or two or more procedures are chosen, and can be applied to file resources out of two or more procedures by the status of a system or intention of an user is not offered.

[0007] File transfer protocol service-system WUFTPD developed in U.S. University of Washington (For example, references, such as the Yoshimura \*\*\*\*, "use [ of internet ], structure 2 FTP , and telnet" UNIX MAGAZINE 1993.6, and ASCII) Add a specific suffix and a specific prefix to the file name which exists really at the time of a read-out transfer of a file, or By specifying the file name which is made by removing a

specific suffix and a specific prefix from the file name which exists really and which does not exist really, the service which transmits the result which took the necessary procedure in file resources is realized.

[0008] However, this system has not made reference at all about the application of a procedure to the file resources in each operation of an opening of the file with which is a file transfer service system and the file system is generally equipped, a closing, generation, deletion, operation of an attribute, listing, writing, the displacement, etc.

[0009]

[Problem(s) to be Solved by the Invention] As opposed to the imagination resources obtained as a result of making this invention in view of the situation mentioned above and giving a predetermined procedure to the existing file resources By embodying the position of the existing file resources, a procedure identifier, and the file resource-management method that matches and manages an imagination identifier It aims at supposing the file resources of two or more computing systems of a network information system, as a result raising the versatility of the whole network information system as an access being possible, to the imagination file resources which have the property for which an user asks.

[0010]

[Means for Solving the Problem] this invention is set to invention according to claim 1. In the file system in the network information system with which two or more computing systems which process information were connected with the network The physical position of the file resources which exist really in the above-mentioned computing system A virtual-file name management tool equipped with the virtual-file resource-management table which matches and carries out the 1 or more sets hold management of the virtual-file name which is the identifier of the procedure identifier which is a unit for processing the real file resources positional information and file resources which are shown, or the identifier of two or more procedures, and imagination file resources, A virtual-file name resolution means to search the above-mentioned real file resources positional information which receives the above-mentioned virtual-file name and becomes settled from the above-mentioned virtual-file name management tool corresponding to the above-mentioned virtual-file name, and the above-mentioned procedure identifier, It is characterized by having a procedure application means to apply the procedure which becomes settled by the above-mentioned procedure identifier to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the above-mentioned virtual-file name acquired by the above-mentioned virtual-file name resolution means, and which exist really.

[0011] In the file system in the network information system with which two or more computing systems which process information were connected with the network in invention according to claim 2 A file name management tool equipped with the file resource-management table which matches and carries out the 1 or more sets hold management of the real file resources positional information which shows the physical position of file resources which carries out the above-mentioned actual existence with the real file name which is the identifier of the file resources which exist really in the above-mentioned computing system, The virtual-file name which is the identifier of imagination file resources It considers as an input. file resources A conversion procedure management tool equipped with the virtual-file name correspondence table which carries out or more 1 hold management of the file name conversion procedure identifier which is the identifier of the file name conversion procedure which outputs a set of the procedure identifier which is a unit for processing, or the identifier of two or more procedures, a real file name, or a virtual-file name, As opposed to the virtual-file name to which the file name conversion procedure corresponding to the one or more above-mentioned file name conversion procedure identifiers of the above-mentioned conversion procedure management tool might be applied to the given virtual-file name A virtual-file name resolution means to output the above-mentioned procedure identifier obtained by the application of the above-mentioned real file resources positional information of the above-mentioned file name management tool, and the above-mentioned file name conversion procedure corresponding to the real file name obtained while the one or more above-mentioned file name conversion procedures were applied recursively, It is characterized by having a procedure application means to apply the procedure which becomes settled by the above-mentioned procedure identifier to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the above-mentioned virtual-file name acquired by this virtual-file name resolution means, and which exist really.

[0012] In invention according to claim 3, it sets to a file system according to claim 1 or 2. A system-state acquisition means to acquire the parameter showing the status of a system, It has further a procedure selection means to choose one or more procedure identifiers from the procedure identifier of this plurality time / of obtaining two or more procedure identifiers corresponding to the virtual-file name which has the above-mentioned virtual-file name resolution means based on the above-mentioned parameter acquired with this system-state acquisition means ]. The above-mentioned virtual-file name resolution means outputs one or more above-mentioned procedure identifiers chosen with the above-mentioned real file resources positional information and the above-mentioned procedure selection means. the above-mentioned procedure application means By the above-mentioned virtual-file name resolution means It is characterized by applying the procedure which becomes settled by the procedure identifier which is chosen with the above-mentioned procedure selection means to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the acquired above-mentioned

virtual-file name, and which exist really, and is outputted from the above-mentioned virtual-file name resolution means.

[0013] In invention according to claim 4, it sets to a file system according to claim 1 or 2. It has further a procedure selection means to choose one or more procedure identifiers from two or more above-mentioned procedure identifiers based on the above-mentioned parameter when the parameter for choosing a procedure is received and the above-mentioned virtual-file name resolution means obtains two or more procedure identifiers corresponding to the above-mentioned virtual-file name. The above-mentioned virtual-file name resolution means outputs one or more above-mentioned procedure identifiers chosen with the above-mentioned real file resources positional information and the above-mentioned procedure selection means. the above-mentioned procedure application means By the above-mentioned virtual-file name resolution means It is characterized by applying the procedure which becomes settled by the procedure identifier which is chosen with the above-mentioned procedure selection means to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the acquired above-mentioned virtual-file name, and which exist really, and is outputted from the above-mentioned virtual-file name resolution means.

[0014] In invention according to claim 5, it sets to a file system according to claim 1 or 2. An identifier analysis means to analyze the syntax of the inputted identifier, and a procedure management tool equipped with the procedure syntax management table which matches a predetermined token and one or more above-mentioned procedure identifiers, It has further a procedure selection means to use the above-mentioned procedure management tool on the basis of the token which appears to the syntax tree as a result of syntax analysis by the above-mentioned identifier analysis means, and to choose one or more above-mentioned procedure identifiers. The above-mentioned virtual-file name resolution means outputs one or more above-mentioned procedure identifiers chosen with the above-mentioned real file resources positional information and the above-mentioned procedure selection means. the above-mentioned procedure application means By the above-mentioned virtual-file name resolution means It is characterized by applying the procedure which becomes settled by the procedure identifier which is chosen with the above-mentioned procedure selection means to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the acquired above-mentioned virtual-file name, and which exist really, and is outputted from the above-mentioned virtual-file name resolution means.

[0015] In invention according to claim 6, it sets to a file system given in the claim 1 or any 1 term of 5. Since the virtual-file resources to the above-mentioned virtual-file name are constituted from a unit corresponding to the virtual-file name acquired by the above-mentioned virtual-file name resolution means, two or more above-mentioned real file resources positional informations and a unit, or two or more above-mentioned procedure identifiers It is characterized by having a formula generation means to generate the formula which consists of a required unit, two or more above-mentioned real file resources positional informations and a unit, or two or more above-mentioned procedure identifiers, and a procedure application means to apply the procedure which becomes settled by the above-mentioned formula generated by this formula generation means.

[0016]

[Function] According to invention according to claim 1, a virtual-file name management tool matches the real file resources positional information which shows the physical position of the file resources which are distributed and arranged on the network, and which exist really, the procedure identifier which is a unit for processing file resources, or the identifier of two or more procedures, and the virtual-file name which is the identifier of imagination file resources, and has managed it in the virtual-file resource-management table. Imagination file resources are file resources which perform a predetermined procedure and are obtained to a certain file resources which exist really. A virtual-file name resolution means will output a procedure identifier and a real file resources positional information, if a virtual-file name is received. [ on the basis of a virtual-file resource-management table ] It is enabled to access imagination file resources by performing the procedure corresponding to a procedure identifier with a procedure application means to the resources which exist really on the basis of the real file resources positional information outputted from the virtual-file name resolution means. Thus, the access to the imagination file resources obtained as a result of applying a predetermined procedure not only to the file resources which exist really but to the file resources which exist really is attained. The imagination file resources which have by this the property for which an user asks can be set up, and imagination file resources can be accessed by the virtual-file name. By such configuration, the handling of file resources can be supposed and the versatility of the whole network information system can be raised.

[0017] According to invention according to claim 2, a file name management tool matches the real file name which is the identifier of the file resources which are distributed and arranged on the network, and which exist really, and the real file resources positional information which shows the physical position of the file resources which exist really, and manages it in a file resource-management table. Moreover, a conversion procedure management tool manages the file name conversion procedure identifier which is the identifier of the file name conversion procedure which outputs a set of the procedure identifier which is a unit for considering the virtual-file name which is the identifier of imagination file resources as an input, and

processing file resources, or the identifier of two or more procedures, a real file name, or a virtual-file name in a virtual-file name correspondence table. A virtual-file name resolution means will apply the file name conversion procedure currently held to the identifier in the virtual-file name correspondence table one by one, if a virtual-file name is inputted. To the acquired virtual-file name, a file name conversion procedure is applied recursively. To a real file name, the real file resources positional information corresponding to a real file name is obtained from a file resource-management table. And the procedure identifier performed by the time it, as a matter of fact, obtained the file resources positional information with the obtained real file resources positional information is outputted. An access is performed by the procedure application means using the procedure corresponding to this outputted procedure identifier. Thus, the access to the imagination file resources corresponding to the given virtual-file name will be performed as an access to the imagination file resources which took the necessary procedure to the file resources on the basis of the real file resources positional information. Thereby, the handling of file resources can be supposed and the high system of versatility can be built.

[0018] According to invention according to claim 3, it has a system-state acquisition means to acquire the parameter showing the status of a system, and when two or more procedure identifiers to which a virtual-file name resolution means corresponds to a virtual-file name are obtained, a procedure selection means chooses one or more procedure identifiers from two or more procedure identifiers obtained based on the parameter acquired with the system-state acquisition means. A virtual-file name resolution means outputs one or more procedure identifiers chosen with the procedure selection means with a real file resources positional information. It enables this to access the imagination file resources set by the status of a system. Even if an user does not know the status of a system, he can access the imagination file resources for which it asks.

[0019] When according to invention according to claim 4 the parameter for choosing a procedure from the exterior is set up and a virtual-file name resolution means obtains two or more procedure identifiers corresponding to a virtual-file name, based on the parameter set up, one or more procedure identifiers are chosen from two or more procedure identifiers with a procedure selection means. A virtual-file name resolution means outputs one or more procedure identifiers chosen with the procedure selection means with a real file resources positional information. It enables this to change the imagination file resources to access according to the specification from an user, the result of a certain processing, etc.

[0020] According to invention according to claim 5, the procedure management tool has the procedure syntax management table which matches a predetermined token and one or more procedure identifiers, analyzes the syntax of the inputted identifier with an identifier analysis means, as a result of syntax analysis, uses the above-mentioned procedure management tool on the basis of the token which appears to a syntax tree, and chooses one or more procedure identifiers with a procedure selection means. A virtual-file name resolution means outputs one or more procedure identifiers chosen with the procedure selection means with a real file resources positional information while it asks for a real file resources positional information on the basis of the token which appears to the syntax tree as a result of syntax analysis by the identifier analysis means. By using the result of such syntax analysis, a parameter, the procedure to choose, a further needed real file name, etc. can be directed now at the time of the input of a virtual-file name. The flexibility at the time of an user accessing imagination file resources by this can be raised.

[0021] According to invention according to claim 6, a formula generation means generates a formula from the real file resources positional information obtained with the virtual-file name resolution means, and a procedure identifier. And a procedure application means can perform the access to the real file resources by the virtual-file name using the formula generated with the formula generation means. Therefore, in order to access to imagination file resources, about the content of processing which should be performed to needed real file resources, an user does not need to know and it is enabled to access to real file resources automatically only by the virtual-file name.

[0022]

[Example] Drawing 1 is a block diagram showing the 1st example of the file system of this invention. the inside of drawing, and 1 -- the communications department and 2 -- the file name Management Department and 3 -- the virtual-file name Management Department and 4 -- the procedure Management Department and 5 -- the file R/W section and 6 -- for a file resource-management table and 13, as for a virtual-file resource-management table and 15, the virtual-file name resolution section and 14 are [ the procedure application section and 11 / the file name resolution section and 12 / the procedure reference section and 16 ] procedure management tables

[0023] The communications department 1 receives the demand to a file system, and requires from the file name Management Department 2, the virtual-file name Management Department 3, the procedure Management Department 4, the file R/W section 5, and the procedure application section 6 according to the content of a demand. The communications department 1 is equivalent to a kernel interface with the file system in a client server method with the file system for example, in UNIX operating system at the interface fraction of a remote procedure call.

[0024] The file name Management Department 2 is constituted by the file name resolution section 11 and the file resource-management table 12. The file resource-management table 12 is a table which consists of a file name and a dyadic group of the physical position of a file. With the physical position of a file, it is

equivalent to the host name on the network in the block number for example, in a disk system, i node number in UNIX file system, and a distributed file system, a file name local to a host, etc. The file name resolution section 11 uses the demanded file name as a key, investigates the file resource-management table 12, and returns the physical position of the file corresponding to the file name. Moreover, to the file resource-management table 12, a file name and the dyadic group of the physical position of a file can be added, or the file name resolution section 11 can also be constituted so that it may have the function deleted from a table. In the example shown in drawing 1, the line applicable to name1 and name2 in the file resource-management table 12, and ... is for managing the file which exists really, and it is shown, respectively that the physical positions of the file expressed with name1, name2, and ... are Loc1, Loc2, and ...

[0025] The virtual-file name Management Department 3 is constituted by the virtual-file name resolution section 13 and the virtual-file resource-management table 14. The virtual-file resource-management table 14 is a table which consists of 3 \*\*\*\*s of a virtual-file name, the physical position of the file which exists really, and a procedure identifier. The virtual-file name resolution section 13 uses the demanded virtual-file name as a key, investigates the virtual-file resource-management table 14, and returns a corresponding physical position and a corresponding procedure identifier. Moreover, the virtual-file name resolution section 13 can add 3 \*\*\*\*s of a virtual-file name, the physical position of the file which exists really, and a procedure identifier to the virtual-file resource-management table 14, or it can also constitute them so that it may have the function deleted from a table. In the example shown in drawing 1, the line applicable to vname1 and vname2 of the virtual-file resource-management table 14, and ... is for managing an imagination file. For example, it is shown that the imagination file expressed with vname1 is an imagination file obtained with the application of a procedure proc1 to the file in a position Loc1 which exists really. Moreover, it is shown that the imagination file expressed with vname4 is an imagination file obtained with the application of procedures proc2 and proc3 in the order of proc2 and proc3 to the file in a position Loc1 which exists really. Moreover, it is shown that the imagination file expressed with vname5 is an imagination file obtained to the file in a position Loc1 which exists really with the application of any one of procedures proc2 and proc3. For example, you may be made to choose one of the procedures which have more than one according to whether the modality of demand is read-out, or it is writing.

[0026] The procedure Management Department 4 is constituted by the procedure reference section 15 and the procedure management table 16. The procedure management table 16 is a table which consists of a procedure identifier and a dyadic group of a procedure definition. The procedure reference section 15 uses the demanded procedure identifier as a key, investigates the procedure management table 16, and returns a corresponding procedure definition. Moreover, the procedure reference section 15 can add a procedure identifier and the dyadic group of a procedure definition to the procedure management table 16, or it can also constitute them so that it may have the function deleted from a table.

[0027] The file R/W section 5 receives the read-out demand from the communications department 1 and the procedure application section 6, and a write-in demand. In a read-out demand, the physical position of a file is given, the file stored in the position where it was specified is read, and a read-out result is returned. In a write-in demand, the physical position and the write-in content of a file are given, and a file is written in the specified physical position.

[0028] The procedure application section 6 receives the read-out demand from the communications department 1, and a write-in demand. In a read-out demand, the physical position and procedure definition of a file are given, the physical position of a file is given to it to the file R/W section 5, and a read-out demand is issued. The procedure application section 6 takes the necessary procedure to the read-out result of a file according to the given procedure definition. In a write-in demand, the physical position of a file, a procedure definition, and the write-in content are given, the result which gave the given procedure which wrote in and followed the procedure definition to the content is made into the 2nd [ to the file R/W section 5 ] write-in content, a physical position is given further, and the procedure application section 6 carries out a write-in demand. The procedure application section 6 can also be constituted so that it may require by writing in so that it may process to the information which should be processed and written in to the information read from the file using the formula which generated and generated the formula from the physical position of the procedure definition received from the communications department 1, and a file and it may write in a file.

[0029] Drawing 2 is a flow chart which shows an example of the operation in the 1st example of the file system of this invention. Drawing 2 shows the case where a read-out demand is performed. First, in S31, a file name and a read-out demand are received in the communications department 1. In S32, the communications department 1 gives a file name resolution demand to the file name Management Department 2 so that the received file name may be solved. If the demanded file name is registered into the file resource-management table 12, a file name and the dyadic group of the physical position are returned, and if the file name Management Department 2 is not registered, it will return as an undefined.

[0030] In S33, the answer from the file name Management Department 2 judges whether it is an undefined, and if it is not an undefined, the received identifier is a file name which exists really. In S34, the communications department 1 hands the physical position of the file obtained from the file name Management Department 2 to the file R/W section 5, reads the content from the physical position, and

returns to a requiring agency.

[0031] In S33, when the answer from the file name Management Department 2 is an undefined, the communications department 1 requires a resolution of a file name of the virtual-file name Management Department 3 in S35. The virtual-file name Management Department 3 will return 3 \*\*\*\*s of the physical position of a file, and a procedure identifier which exist really with a virtual-file name, if the demanded file name is registered into the virtual-file resource-management table 14. In S36, it judges whether they are whether 3 \*\*\*\*s were returned from the virtual-file name Management Department 3, and an undefined, and if it is an undefined, it will return to a requiring agency as an error of a file name.

[0032] When 3 \*\*\*\*s are obtained in S36, the communications department 1 requires the procedure definition corresponding to the procedure identifier obtained at the virtual-file name Management Department 3 of the procedure Management Department 4 in S37. The procedure Management Department 4 will return the dyadic group of a procedure identifier and a procedure definition, if the demanded procedure identifier is registered into the procedure management table 16. In S38, it judges whether they are whether the dyadic group was obtained from the procedure management table 16, and an undefined, and if it is an undefined, it will return to a requiring agency, using as an error the purport whose procedure is an undefined.

[0033] When a dyadic group is obtained in S38, the communications department 1 demands the physical position of the file which was obtained from the virtual-file name Management Department 3 to the procedure application section 6 and which exists really in S39 by reading with the procedure definition obtained from the procedure Management Department 4. Further, to the file R/W section 5, the procedure application section 6 passes the physical position of the file which exists really, and performs a read-out demand. The procedure based on a procedure definition was performed in the procedure application section 6, the procedure was performed, the information read from the file R/W section 5 is read, and an information is returned from the communications department 1 to a requiring agency.

[0034] The access to the demanded file writes in and processing of S34 and S39 is only different among the flow charts which showed processing at the time of being a demand in drawing 2. Namely, when it is a file name corresponding to the file in which the given file name exists really, the communications department 1 requires by passing and writing the information which should be written in with the physical position of the file obtained from the file name Management Department 2 in the file R/W section 5. And the file R/W section 5 writes in the information which should be written in the physical position of a file. Moreover, when the given file name is a virtual-file name, the communications department 1 hands the information which should be written in with the physical position and physical procedure definition of a file to the procedure application section 6. The procedure application section 6 gives the procedure based on a procedure definition to the information which should be written in, and passes the information to the file R/W section 5 with the physical position of a file. The file R/W section 5 writes the write-in information to which the procedure was given in the physical position of the file passed from the procedure application section 6.

[0035] Hereafter, an above-mentioned operation is explained using an example. Here, it explains on the basis of an example as that by which the information shown in drawing 1 is stored in the file resource-management table 12, the virtual-file resource-management table 14, and the procedure management table 16.

[0036] First, an operation in case a file name name1 is specified and read to the communications department 1 and a demand is performed is explained. The communications department 1 will require that the file name resolution corresponding to a file name name1 is performed to the file name resolution section 11 of the file name Management Department 2, if a read-out demand of the file shown by the file name name1 is received. The file name resolution section 11 uses a file name name1 as a key, searches the file resource-management table 12, and obtains the dyadic group of <name1, Loc1>. And this is considered as a result and it returns to the communications department 1. Since the item corresponding to the file resource-management table 12 in the communications department 1 was stored, it is judged that this file is a file which exists really. The communications department 1 hands the physical position Loc1 of a file to the file R/W section 5, and performs a read-out demand. The file R/W section 5 reads the file in a position Loc1, and returns a read-out result to the communications department 1. The communications department 1 returns to the claimant of read-out of a read-out result.

[0037] Next, an operation in case a file name vname1 is specified and read to the communications department 1 and a demand is performed is shown. The communications department 1 will require that the file name resolution corresponding to a file name vname1 is performed to the file name resolution section 11 of the file name Management Department 2, if a read-out demand of the file shown by the file name vname1 is received. Although the file resource-management table 12 is searched, using a file name vname1 as a key, since a corresponding item does not exist, the file name resolution section 11 returns a result as an undefined.

[0038] The communications department 1 which received the result of the undefined from the file name resolution section 2 requires that the file name resolution corresponding to a file name vname1 is performed to the virtual-file name resolution section 13 of the virtual-file name Management Department 3. The virtual-file name resolution section 13 searches the virtual-file resource-management table 14, and obtains 3 \*\*\*\*s of <vname1, Loc1, proc1>. Since the item corresponding to the virtual-file resource-management table 14 in the communications department 1 was stored, it is judged that this file is an imagination file. The communications department 1 which received the result of 3 \*\*\*\*s of the above from the virtual-file name



Management Department 3 demands the procedure definition corresponding to a procedure identifier `proc1` from the procedure reference section 15 of the procedure Management Department 4. The procedure reference section 15 uses a procedure identifier `proc1` as a key, searches the procedure management table 16, and returns `<proc1, def1>` as a result.

[0039] The communications department 1 hands the physical position `Loc1` and the procedure definition `def1` to the procedure application section 6. The procedure application section 6 passes the physical position `Loc1` to the file R/W section 5, and performs a read-out demand. The file R/W section 5 performs read-out from the physical position `Loc1`, and returns a read-out result to the procedure application section 6. According to a procedure definition, the procedure application section 6 takes the necessary procedure to a read-out result, and returns the 2nd read-out result to the communications department 1. The communications department 1 returns the 2nd read-out result received from the procedure application section to the claimant of read-out.

[0040] The operation in case it writes in to the communications department 1 and a demand is performed is the same as that of an almost above-mentioned operation. For example, when a file name `name1` is specified and written in to the communications department 1 and a demand is performed, the communications department 1 gets the dyadic group of `<name1, Loc1>` from the file name Management Department 2, writes in the file R/W section 5 with the physical position `Loc1`, hands an information to the file R/W section 5, and performs a write-in demand. The file R/W section 5 is written in the physical position `Loc1`, and writes in an information. Moreover, when a file name `vname1` is specified and written in to the communications department 1 and a demand is performed, the communications department 1 gets the dyadic group of `<proc1, def1>` from the procedure Management Department 4, and hands the physical position `Loc1` and the procedure definition `def1` to the procedure application section 6 while 3 \*\*\*\*s of `<vname1, Loc1, proc1>` are obtained from the virtual-file name Management Department 3. The procedure application section 6 gives the procedure which becomes settled by the procedure definition `def1` to the write-in information from a claimant, passes the 2nd write-in information to the file R/W section 5 with the physical position `Loc1`, and performs a write-in demand. The file R/W section 5 writes the 2nd write-in information in the physical position `Loc1`.

[0041] Drawing 3 is a block block diagram showing the 2nd example of the file system of this invention. The same sign is given to the same fraction as drawing 1, and an explanation is omitted. 17 is the virtual-file name correspondence section, and 18 is a virtual-file name correspondence table. In this example, the virtual-file name Management Department 3 is doing the hold management also of the file resource-management table 12. The virtual-file name correspondence table 18 is a table which consists of a file name conversion procedure. The file name conversion procedure which is the element of the virtual-file name correspondence table 18 is a procedure which considers a file name as an input and considers a set of a procedure definition and a file name as an output. A file name is given and the virtual-file name correspondence section 17 returns a procedure definition as a result.

[0042] Drawing 4 is a flow chart which shows an example of the operation in the 2nd example of this invention. Drawing 4 shows an example of the operation at the time of demanding read-out processing. In S41, a file name and a read-out demand are received in the communications department 1. The communications department 1 performs a file name resolution demand to the virtual-file name Management Department 3 so that the received file name may be solved. At the virtual-file name Management Department 3, the file resource-management table 12 is searched in S42, using as a key the file name which the virtual-file name resolution section 13 received. Here, when the received file name exists in the file resource-management table 12, the physical position of the file corresponding to a file name and its file name is obtained from the file resource-management table 12. It becomes the undefined in not existing. In S43, the reference result of the file resource-management table 12 judges whether it is an undefined. In not being an undefined, it corresponds to the file in which the demanded file name exists really. The communications department 1 requires in S44 by receiving the physical position of a file name and its file from the virtual-file name Management Department 3, and passing and reading the physical position of a file to the file R/W section 5. The file R/W section 5 reads an information from the physical position of the received file, and returns it to a requiring agency through the communications department 1.

[0043] Moreover, in S43, when the undefined, i.e., the demanded file name, is a virtual-file name, in S45, a resolution of a virtual-file name is demanded from the virtual-file name correspondence section 17. When it is not able to be judged and solved whether it was solvable in the virtual-file name correspondence section 17 in S46, it returns to a requiring agency as an error. When it is able to solve, a procedure definition and a file name are returned to the virtual-file name resolution section 13 from the virtual-file name correspondence section 17. In the virtual-file name correspondence section 17, in S47, it asks for the physical position which corresponds from a file name using the file resource-management table 12, and returns to the communications department 1 with a procedure definition. In S48, the communications department 1 hands a procedure definition and the physical position of a file to the procedure application section 6, and performs a read-out demand. The procedure application section 6 passes the physical position of a file to the file R/W section 5, and performs a read-out demand. The file R/W section 5 reads an information from the physical position of the received file, and passes it to the procedure application section 6. In the procedure application section 6, the procedure based on a procedure definition is given to the information read in the



file R/W section 5, and it returns to a requiring agency through the communications department 1.

[0044] In performing a write-in demand, processing of S44 and S48 is only different among the flow charts shown in drawing 4. When it is a thing corresponding to the file in which the file name which the communications department 1 received exists really, as processing corresponding to S44, the communications department 1 writes in with the physical position of the file obtained from the virtual-file name Management Department 3, and hands an information to the file R/W section 5. The file R/W section 5 is written in the physical position of the received file, and writes in an information. When the file name which the communications department 1 received is a virtual-file name, as processing corresponding to S48, with the procedure definition obtained from the virtual-file name Management Department 3, and the physical position of a file, the communications department 1 hands a write-in information to the procedure application section 6, and performs a write-in demand. The procedure application section 6 takes the necessary procedure to a write-in information based on a procedure definition, and passes the physical position of a file to the file R/W section 5 with this information. The file R/W section 5 writes in a write-in information after taking the necessary procedure in the physical position of a file.

[0045] Drawing 5 is a flow chart which shows an example of an operation of the virtual-file name correspondence section 17 in the 2nd example of this invention. First, in S51, a file name conversion procedure is taken out from the entry of the beginning of the virtual-file name correspondence table 18. In S52, the file name conversion procedure taken out to the file name is given. In S53, the result which gave the file name conversion procedure to the file name judges whether it is an undefined, and, in the case of the undefined, it judges whether the following file name conversion procedure exists by S54 further. When the following file name conversion procedure does not exist, processing of the virtual-file name correspondence section 17 is ended, using a procedure definition as the undefined. When the following file name conversion procedure exists, the following file name conversion procedure is taken out from the virtual-file name correspondence table 18 by S55, it returns to S52, and the file name conversion procedure is processed.

[0046] In S53, when a result is not an undefined, in S56, the element of a set of the file name obtained as a result of giving a file name conversion procedure is alike, respectively, it receives, and the file resource-management table 12 is searched in S57, it judges whether all file names existed in the file resource-management table 12. When all file names exist in the file resource-management table 12, in S58, the new procedure definition which replaced the file name of the procedure definition obtained by execution of a file name conversion procedure in the physical position of the file which was obtained by the file resource-management table 12, and which exists really is generated, the generated new procedure definition is returned as a result, and processing is ended.

[0047] In S57, when the file name which is not indicated in the file resource-management table 12 exists in the element of a set of a file name, in S59, the \*\*\*\*\* rhythm recursively shown in drawing 5 is performed to the each of, and the file name in a procedure definition is replaced by the procedure definition obtained by recursive execution in S60. However, when conversion of the same identifier is needed again in the middle of conversion of a certain identifier, let a result be an undefined.

[0048] An example of an above-mentioned operation is explained on the basis of an example. The information shall be stored in file resource-management virtual-file name correspondence Table 12 and 18 as shown in drawing 3. Here, the file name conversion procedures NProc1 shall be the set which removes a character string ".Z" from the last of this file name, and uses only file name N as an element, and a procedure which returns a formula called Proc1 (N), when the given file name is N.Z. The file name conversion procedures NProc2 shall be the set which uses only file name N' which upper-case-ized all the characters that constitute given file name N as an element, and a procedure which returns a formula called Proc2 (N').

[0049] To read to a file name called name1.Z now should be demanded. Hereafter, the operation in this case is shown. In S41, the communications department 1 receives this demand and requires a resolution of a file name of the virtual-file name Management Department 3. In S42, the virtual-file name resolution section 13 uses given file name name1.Z as a key, and searches the file resource-management table 12. However, since a corresponding item does not exist, it progresses to S45 from S43, and a resolution of file name name1.Z is required of the virtual-file name correspondence section 17.

[0050] The algorithm shown in drawing 5 is performed in the virtual-file name correspondence section 17. That is, in S51, from the virtual-file name correspondence table 18, the first file name conversion procedure NProc1 is taken out, and it applies to file name name1.Z in S52. Consequently, the file name conversion procedure NProc1 outputs the set name1 and the procedure definition Proc1 (name1) of a file name. Since this output is not an undefined, it uses as a key the element name1 of the file name set which progresses to S56 from S53, and was outputted, and searches the file resource-management table 12. However, since a corresponding item does not exist, it moves to S59 from S57, and an algorithm 1 is again applied recursively to a file name name1.

[0051] The file name conversion procedure NProc1 is taken out from the virtual-file name correspondence table 18 by S51, and it applies to a file name name1 by S52. Since it becomes the undefined and the following file name conversion procedure exists, this result progresses to S54 and S55 from S53, takes out the following file name conversion procedure NProc2 from the virtual-file name correspondence table 18, and applies it to a file name name1 by S52. Consequently, the file name conversion procedure NProc2 outputs the set NAME1 and the procedure definition Proc2 (NAME1) of a file name. Since it is not an undefined, it

progresses to S54 from S53, and this result uses the element NAME1 of a set of a file name as a key, it searches the file resource-management table 12, and obtains as a result the position Loc1 where a file is physical. Consequently, since it means that all of sets of the file name obtained by the application of the file name conversion procedure Nproc2 had existed in the file resource-management table 12, it progresses to S58 from S57, the file name NAME1 of a procedure definition Proc2 (NAME1) is transposed to the physical position Loc1 of a file on the basis of the reference result of the file resource-management table 12, and the new procedure definition Proc2 (Loc1) is obtained. This ends recursive processing and it returns to processing of a basis.

[0052] In S60, the file name name1 of a procedure definition Proc1 (name1) is further replaced by the procedure definition Proc2 (Loc1) obtained by recursive processing, the new procedure definition Proc1 (Proc2 (Loc1)) is obtained, and processing of the virtual-file name correspondence section 17 is ended.

[0053] It progresses to S47 from S46, and since file name name1.Z was solved by the above processings of the virtual-file name correspondence section 17, the virtual-file name resolution section 13 receives a procedure definition Proc1 (Proc2 (Loc1)) from the virtual-file name correspondence section 17, and passes this to the procedure application section 6 through means of communications 1 by them. At this time, as shown in S47, about a set of the obtained file name, the physical position of a file is obtained from the file resource-management table 12, and it may be made to pass the procedure application section 6 with a procedure definition.

[0054] In S48, it is required that the procedure application section 6 reads the file expressed in the physical position Loc1 of a file to the file R/W section 5. The procedure application section 6 receives the read-out result of a file from the file R/W section 5, and obtains the 2nd result with the application of a procedure Proc2 to the result. Furthermore, a procedure Proc1 is applied to the 2nd result, and the 3rd result is obtained. The communications department 1 receives the 3rd result from the procedure application section 6, and returns this to the claimant of read-out.

[0055] Drawing 6 is a block block diagram showing the 3rd example of the file system of this invention. Among drawing, the same sign is given to the same fraction as drawing 1, and an explanation is omitted. 19 is the system-state acquisition section and 20 is the procedure selection section. This example shows the example which prepared the virtual-file name Management Department 3 in the 1st above-mentioned example the system-state acquisition section 19 and the procedure selection section 20. Of course, it is also possible to constitute on the basis of the 2nd above-mentioned example.

[0056] The system-state acquisition section 19 returns the parameter which becomes settled according to the status of a system according to a demand of the procedure selection section 20. The procedure selection section 20 passes a file name to the virtual-file name resolution section 13, and returns the procedure identifier which chose the procedure shown with the parameter returned by the system-state acquisition section 19, and was chosen as the communications department 1 from two or more procedure identifiers returned as the result with the physical position of a file.

[0057] An example of the operation in the 3rd example of the file system of this invention is explained. An operation in case a file name vname5 is specified and read to the communications department 1 as an example and a demand is performed is shown. The system-state acquisition section 19 shall return "2" as a parameter corresponding to the status of the present system.

[0058] The communications department 1 will require that the file name resolution corresponding to a file name vname5 is performed to the file name resolution section 11 of the file name Management Department 2, if a read-out demand of the file shown by the file name vname5 is received. The file name resolution section 11 uses a file name vname5 as a key, and searches the file resource-management table 12. However, since a corresponding item does not exist, a result is returned as an undefined.

[0059] The communications department 1 which received the result of the undefined from the file name resolution section 11 requires that the file name resolution corresponding to a file name vname5 is performed to the procedure selection section 20 of the virtual-file name Management Department 3. The procedure selection section 20 asks the status of the present system to the system-state acquisition section 19 at the same time it requires that the resolution corresponding to a file name vname5 before a file name is performed to the virtual-file name resolution section 13.

[0060] The virtual-file name resolution section 13 uses a file name vname5 as a key, searches the virtual-file resource-management table 14, and obtains 3 \*\*\*\*s of <vname5, Loc2, proc2+proc3>. On the other hand, the system-state acquisition section 19 passes the parameter "2" corresponding to the status of the present system to the procedure selection section 20.

[0061] From the procedure identifier in 3 \*\*\*\*s obtained in the virtual-file name resolution section 13 "proc2+proc3", the procedure selection section 20 chooses the 2nd "proc3" according to a parameter "2", and returns 3 \*\*\*\*s of <vname5, Loc2, proc3> to the communications department 1.

[0062] The communications department 1 demands the procedure definition corresponding to a procedure identifier proc3 from the procedure reference section 15 of the procedure Management Department 4. The procedure reference section 15 searches the procedure management table 16, considers the dyadic group of <proc3, def3> as a result, and returns it to the communications department 1. The communications department 1 hands the physical position Loc2 and the physical procedure definition def4 of a file to the procedure application section 6. The procedure application section 6 passes the physical position Loc2 of a

file to the file R/W section 5, and performs a read-out demand. The file R/W section 5 performs read-out from the physical position Loc2 of a file, and returns a read-out result to the procedure application section 6.

According to a procedure definition def4, the procedure application section 6 takes the necessary procedure to a read-out result, and returns the 2nd result to the communications department 1. The communications department 1 returns the 2nd result received from the procedure application section 6 to the claimant of read-out.

[0063] Here, although the case of a read-out demand was explained on the basis of the example, it can carry out similarly about the case of a write-in demand. For example, in the write-in demand to a file name vname5, the procedure application section 6 takes the necessary procedure to the information which should be written in according to a procedure definition def4, and acquires the 2nd write-in information. And it is required that the 2nd write-in information is written in the physical position Loc2 of a file to the file R/W section 5.

[0064] Drawing 7 is a block diagram showing the 4th example of the file system of this invention. Among drawing, the same sign is given to the same fraction as drawing 1, and an explanation is omitted. 21 is the procedure selection section. This example shows the example which prepared the virtual-file name Management Department 3 in the 1st above-mentioned example the procedure selection section 21. Of course, it is also possible to constitute on the basis of the 2nd above-mentioned example.

[0065] A file name and a parameter are given from the communications department 1, and the procedure selection section 21 passes a file name to the virtual-file name resolution section 13, and returns the procedure which chooses the procedure shown with a parameter and was chosen as the communications department 1 from two or more procedures returned as the result with the physical position of a file.

[0066] The parameter which the procedure selection section 21 uses can also be constituted so that the result which performed that an user besides the configuration obtained through the communications department 1 sets up manually from a keyboard etc. \*\*\*\* or a certain processing may be used.

[0067] An example of the operation in the 4th example of the file system of this invention is explained. An operation in case a file name vname5 and a parameter "2" are specified and read to the communications department 1 as an example and a demand is performed is shown.

[0068] If a read-out demand of the file which specified the file name vname5 and the parameter "2" is received, the communications department 1 will separate a file name and a parameter, and will require that the file name resolution corresponding to a file name vname5 is performed to the file name resolution section 11 of the file name Management Department 2. Although the file resource-management table 12 is searched, using a file name vname5 as a key, since a corresponding item does not exist, the file name resolution section 11 returns a result as an undefined.

[0069] The communications department 1 which received the result of the undefined from the file name resolution section 11 requires that the file name resolution corresponding to a file name vname5 and a parameter "2" is performed to the procedure selection section 21 of the virtual-file name Management Department 3. The procedure selection section 21 requires that the name resolution corresponding to a file name vname5 is performed to the virtual-file name resolution section 13. The virtual-file name resolution section 13 uses a file name vname5 as a key, searches the virtual-file resource-management table 14, and obtains 3 \*\*\*\*s of <vname5, Loc2, proc2+proc3>. From the procedure identifier in 3 \*\*\*\*s "proc2+proc3", the procedure selection section 21 which received the reference result from the virtual-file name resolution section 13 chooses the 2nd "proc3" according to a parameter "2", and returns 3 \*\*\*\*s of <vname5, Loc2, proc3> to the communications department 1.

[0070] The communications department 1 demands the procedure definition corresponding to a procedure identifier proc3 from the procedure reference section 15 of the procedure Management Department 4. The procedure reference section 15 searches the procedure management table 16, considers the dyadic group of <proc3, def3> as a result, and returns it to the communications department 1. The communications department 1 hands the physical position Loc2 and the physical procedure definition def4 of a file to the procedure application section 6. The procedure application section 6 passes the physical position Loc2 of a file to the file R/W section 5, and performs a read-out demand. The file R/W section 5 performs read-out from the physical position Loc2 of a file, and returns a read-out result to the procedure application section 6.

According to a procedure definition def4, the procedure application section 6 takes the necessary procedure to a read-out result, and returns the 2nd result to the communications department 1. The communications department 1 returns the 2nd result received from the procedure application section 6 to the claimant of read-out.

[0071] Drawing 8 is a block diagram showing the 5th example of the file system of this invention. Among drawing, the same sign is given to the same fraction as drawing 1, and an explanation is omitted. For an identifier syntax analyzer and 24, as for a procedure syntax management table and 26, the procedure selection section and 25 are [ 22 / the lexical-analysis section and 23 / a token type table and 27 ] delimiter information tables. In this example, the virtual-file name Management Department 3 shows the configuration which has the lexical-analysis section 22, the identifier syntax analyzer 23, and the procedure selection section 24. Moreover, the virtual-file name Management Department 3 includes the file name Management Department 2 which has the file name resolution section 11 and the file resource-management table 12. In addition to this, the virtual-file name Management Department 3 holds and manages the procedure syntax

management table 25, the token type table 26, and a delimiter information table. When the identifier given as an input is not indicated in the file resource-management table 12, after the virtual-file name Management Department 3 in this example decomposes an identifier into a token by the lexical-analysis section 22, it analyzes a token train by the identifier syntax analyzer 23 and the procedure syntax management table 25, and acquires the procedure over the given identifier by passing the analysis result to the procedure selection section 24.

[0072] By procedure syntax management delimiter information Table 25 and 27, the lexical-analysis section 22 starts a token from the character string which constitutes the given identifier, and registers it into the token type table 26.

[0073] A syntax analyzer 23 investigates a type about each token started in the lexical-analysis section 22, is registered into the token type table 26, investigates the priority of each token from the procedure syntax management table 25, builds a syntax tree, and passes it to the procedure selection section 24.

[0074] About the token into which the type is registered as an identifier in the token type table 26, the procedure selection section 24 investigates the physical position of a file from the file resource-management table 12, and chooses a procedure from a syntax tree and the procedure syntax management table 25.

[0075] The procedure syntax management table 25 is a table used in case the identifier syntax analyzer 23 analyzes syntax. Drawing 9 is explanatory drawing of an example of the procedure syntax management table 25. The procedure syntax management table 25 consists of a type of operator names, such as a keyword which appears in a file name, and an operator, priority, and procedure selection rule. "scale" and "Z" express an operator name among drawing, respectively, "x.scale.y" and "x.Z" express the type of an operator, respectively, "2" and "1" express priority, respectively, and "pnmscale (y, x)" and "compress (x)" express procedure selection rule, respectively.

[0076] The token type table 26 is a table which is registered in the lexical-analysis section 22 and the identifier syntax analyzer 23, and is referred to in the procedure selection section 24. It is an empty table when a file name is passed to the virtual-file name Management Department 3. Drawing 10 is explanatory drawing of an example of the token type table 26. The token started in the lexical-analysis section 22 and the type matched by the identifier syntax analyzer 23 are stored in the token type table 26. In drawing 10, three tokens "image", "scale", and "2" are started in the lexical-analysis section 22, and it registers with the token type table 26. Moreover, the "identifier", the "operator", and the "parameter" are matched by the identifier syntax analyzer 23 as a type corresponding to each token.

[0077] In case the delimiter information table 27 starts a token in the lexical-analysis section 22, it holds the information on the delimiter inserted between each token. Drawing 11 is explanatory drawing of an example of the delimiter information table 27. In drawing 11, "." is registered as a delimiter. In the lexical-analysis section 22, a delimiter "." is looked for out of a file name, and a token is started before and behind this delimiter.

[0078] An example of the operation in the 5th example of the file system of this invention is explained. Drawing 12 is a flow chart explaining an operation of the virtual-file name Management Department 3. When the file name given as an input is not indicated in the file resource-management table 12, after the virtual-file name Management Department 3 divides the given file name into a token by the lexical-analysis section 22, it analyzes a token train in the identifier syntax analyzer 23 using the procedure management table 15, and hands the analysis result to the procedure selection section 24. And in the procedure selection section 24, the physical position and physical procedure of a file are acquired based on an analysis result.

[0079] First, a file name is received in S71. And in S72, the received file name is looked for from the file resource-management table 12. Supposing it judges by S73 whether a file name is shown in the file resource-management table 12 and a file name exists in the file resource-management table 12 at this time, in S74, the physical position of a file will be obtained from the file resource-management table 12, it will return as a result of an inquiry, and processing will be ended.

[0080] In S73, when the file name received to the file resource-management table 12 does not exist, in S75, a token is started from the file name received by the lexical-analysis section 22. At this time, it judges by S76 whether the token was able to be started or not. When a token cannot be started, in S77, it tells the communications department 1 that there is no corresponding file name, and processing is ended.

[0081] When the lexical-analysis section 22 is able to start a token by S75, it progresses to S78 from S76, and a syntax tree is made by the identifier syntax analyzer 23. At this time, it judges by S79 whether the syntax tree was able to be made. When a syntax tree is not able to be made, in S80, it tells the communications department 1 that a file name is inaccurate, and processing is ended.

[0082] When a syntax tree is able to be made from S78, it progresses to S81 from S79, and a procedure is chosen by the procedure selection section 24. At this time, it judges by S82 whether the procedure was able to be chosen or not. When a procedure is not able to be chosen, in S83, it tells the communications department 1 having failed in selection of a procedure, and processing is ended.

[0083] When a procedure is able to be chosen by S81, it returns to the communications department 1 as a result of the physical position of the file which progresses to S84 from S82, and was obtained, and an inquiry of the selected procedure.

[0084] The communications department 1 thinks the selected procedure to be the physical position of the file returned from the virtual-file name Management Department 3. And the procedure definition corresponding

to a procedure identifier is demanded from the procedure reference section 15 of the procedure Management Department 4. The procedure reference section 15 uses a procedure identifier as a key, searches the procedure management table 16, and returns a procedure definition. The communications department 1 writes in the physical position and physical procedure definition of a file, and it in read-out, and hands that class to the procedure application section 6. In writing, the information which should be written in is also passed.

[0085] When the designation from a claimant is read-out of a file, the procedure application section 6 passes the physical position of a file to the file R/W section 5, and performs a read-out demand. The file R/W section 5 performs read-out from the physical position of a file, and returns a read-out result to the procedure application section 6. According to a procedure definition, the procedure application section 6 takes the necessary procedure to a read-out result, and returns the 2nd result to the communications department 1. The communications department 1 returns the 2nd result received from the procedure application section 6 to the claimant of read-out.

[0086] Moreover, when the designation from a claimant is the writing of a file, the procedure application section 6 takes the necessary procedure to the information which should be written in according to a procedure definition, and is passed to the file R/W section 5 with the physical position of a file. The file R/W section 5 writes the information which took the necessary procedure and which should be written in in the physical position of a file.

[0087] Next, logging processing of the token by the lexical-analysis section 22 performed in S75 among flowing of processing shown in drawing 12 is explained. Drawing 13 is a flow chart for explaining an example of an operation of the lexical-analysis section 22. As mentioned above, the lexical-analysis section 22 starts a token from the character string which constitutes the given file name using procedure syntax management delimiter information Table 25 and 27, and registers it into the token type table 26.

[0088] In S91, it investigates whether a delimiter information is first acquired from the delimiter information table 27, and a delimiter is in the character string which constitutes a file name. If it judges whether the delimiter existed in S92 and a delimiter does not exist, processing is ended as what failed in logging of a token. When the delimiter exists, in S93, the character string divided by the delimiter is started as a token. And in S94, the started token is registered into the token type table 26, and processing is ended.

[0089] Next, processing of a creation of the syntax tree by the identifier syntax analyzer 23 performed in S78 among flowing of processing shown in drawing 12 is explained. Drawing 14 is a flow chart for explaining an example of an operation of the identifier syntax analyzer 23. As mentioned above, the identifier syntax analyzer 23 investigates a type about each of the token started in the lexical-analysis section 22, is registered into the token type table 26, investigates the priority of each keyword from the procedure syntax management table 25, makes a syntax tree, and performs processing passed to the procedure selection section 24.

[0090] First, in S101, it judges whether all tokens were processed. When an unsettled token exists, in S102, one unsettled token is taken out from the token type table 26. The file resource-management table 12 is searched based on the taken-out token, and it judges whether the taken-out token is indicated as an item of the file name of the file resource-management table 12 in S103. When the token is indicated in the file resource-management table 12, it registers with the token type table 26 in S104, using the type corresponding to the token as a "identifier." And it returns to S101 and processing about the following token is continued.

[0091] In S103, when the token is not indicated in the file resource-management table 12, the procedure syntax management table 25 is searched on the basis of a token. In S105, if it judges and indicates whether the token is indicated in the procedure syntax management table 25, it will register with the token type table 26, using the type corresponding to a token as a "operator name" in S106. When the token is not indicated in the procedure syntax management table 25, it registers with the token type table 26 in S107, using the type corresponding to a token as a "parameter." In both cases, it returns to S101 and processing about the following token is continued.

[0092] In S101, when processing about all tokens is completed, in S108, each priority is investigated from the procedure syntax management table 25, a syntax tree is created, and processing is ended about the token registered with the operator name in the token type table 26.

[0093] Next, selection processing of the procedure by the procedure selection section 24 performed in S81 among flowing of processing shown in drawing 12 is explained. Drawing 15 is a flow chart for explaining an example of an operation of the procedure selection section 24. As mentioned above, the procedure selection section 24 chooses a procedure from the syntax tree which investigates the physical position of a file from the file resource-management table 12, and was created by the identifier syntax analyzer 23 about the token by which the type is registered into the token type table 26 as a "identifier", and the procedure management table 25.

[0094] First, in S111, the token by which the type is registered into the token type table 26 as a "identifier" is taken out, and it asks for the physical position of the file which searches the file resource-management table 12 and corresponds about those tokens. Then, in S112, based on the syntax tree created in the identifier syntax analyzer 23, the procedure syntax management table 25 is searched and a procedure is acquired. Thus, the procedure chosen with the physical position of the obtained file is returned to the

communications department 1 as a result of the file name resolution in the virtual-file name Management Department 3.

[0095] An example of an operation of the 5th above-mentioned example is explained on the basis of an example. For example, an identifier is transmitted to the name resolution section 2 from the virtual-resource implementation part not to illustrate. Here, the case where specify and read the identifier of "image1.scale.2" which is the identifier of the imagination file which expanded an image file called image1 twice, and a demand is performed is explained. An information which was shown in drawing 8 shall be stored in file resource-management procedure management Table 12 and 16. Moreover, the content which the content shown in drawing 9 showed in drawing 11 as a delimiter information table 27 as a procedure syntax management table 25 shall be stored, respectively. In addition, the token type table 26 is empty in an initial state. As the description technique of the syntax tree generated by the identifier syntax analyzer 23, it is (p c1 about the tree of parent p with children c1, ..., cn. ... Suppose that it is written as cn).

[0096] A demand of the file name "image1.scale.2", and read-out is transmitted from a requiring agency to the communications department 1. The communications department 1 which received the file name hands the virtual-file name Management Department 3 this identifier. In S71 of drawing 12, the virtual-file name Management Department 3 will investigate whether a file name "image1.scale.2" exists in the file resource-management table 12 in S72, if a file name "image1.scale.2" is received. Since a file name "image1.scale.2" does not exist in the file resource-management table 12, it is passed to the lexical-analysis section 22.

[0097] The lexical-analysis section 22 starts a token from a file name in S75. First, in S91 of drawing 13, a delimiter information is acquired from the delimiter information table 27. The obtained delimiter is "." Since a delimiter "." exists in a file name "image1.scale.2", the lexical-analysis section 22 starts a token "image1", "scale", and "2" from a file name "image1.scale.2" in S93 based on a delimiter "." And in S94, while the started token is registered into the token type table 26, the identifier syntax analyzer 23 is passed. At this time, it will be in the status that only the card column of a token was registered into the token type table 26 among the tables shown in drawing 10. The card column of a type is still an undefined.

[0098] The identifier syntax analyzer 23 generates a syntax tree in S78 of drawing 12. First, in S102 of drawing 14, a token "image1" is taken out from the token type table 26, and investigates whether it is indicated by the item of the file name of the file resource-management table 12 in S103. Since the token "image1" is indicated in the file resource-management table 12, in S104, it makes a "identifier" the type corresponding to a token "image1", and registers it into the token type table 26.

[0099] Next, in S102, a token "scale" is taken out from the token type table 26, and investigates whether it is indicated by the item of the file name of the file resource-management table 12 in S103. Since the token "scale" is not indicated in the file resource-management table 12, in S105, a token "scale" investigates whether it is indicated in the procedure syntax management table 25. Since the token "scale" has appeared in the procedure syntax management table 25, in S106, it makes a type a "operator name" and registers it into the token type table 26.

[0100] Next, in S102, a token "2" is taken out from the token type table 26, and investigates whether it is indicated by the item of the file name of the file resource-management table 12 in S103. Since the token "2" is not indicated in the file resource-management table 12, in S105, a token "2" investigates whether it is indicated in the procedure syntax management table 25. Since the token "2" is not indicated in the procedure syntax management table 25, in S107, it makes a type a "parameter" and registers it into a token type table.

[0101] Now, the type about all the tokens registered into the token type table 26 was registered. The token type table 26 which does in this way and was completed is shown in drawing 10. Processing progresses to S108 from S101.

[0102] The identifier syntax analyzer 23 creates a syntax tree in S108 from the token type table 26 which was shown in drawing 10, and the procedure syntax management table 25 shown in drawing 9. As the technique of creating a syntax tree, the syntax-analysis technique, such as operator precedence syntax analysis (a science company, A.V.Aho, R.Sethi, J.D.Ullman, compilers I and P245), can be used, for example. Syntax tree"(scale image 1 2)" is created by syntax tree analysis, and the procedure selection section 24 is passed.

[0103] The procedure selection section 24 chooses a procedure in S81 of drawing 12. First, in S111 of drawing 15, the physical position "location1" of a file is obtained from the file resource-management table 12 about the token "image1" into which the type is registered with the "identifier" in the token type table 26.

Furthermore, in S112, procedure"pnmscale (y, x) is obtained with reference to the procedure syntax management table 25 on the basis of the node "scale" of syntax tree"(scale image 1 2)" generated by the identifier syntax analyzer 23. "image1" of the parents "scale" of a syntax tree which is a child, and "2" are made to correspond to x and y, respectively, and a procedure "pnmscale (2, location1)" is acquired by transposing to the physical position "location1" of the file which was able to obtain "image1" from the file resource-management table 12 further. Thus, with the physical position "location1" of the obtained resources, a procedure "pnmscale (2, location1)" will be sent to the communications department 1 in S84.

[0104] The communications department 1 thinks the selected procedure "pnmscale (2, image1)" to be the physical position "location1" of the file corresponding to a file name "image1.scale.2." The communications department 1 demands the procedure definition corresponding to procedure-identifier pnmscale from the procedure reference section 15 of the procedure Management Department 4. The procedure reference



section 15 uses procedure-identifier pnmscale as a key, searches the procedure management table 16, and returns as a result the dyadic group <pnmscale, def1>. The communications department 1 hands the physical position location1 and the physical procedure definition def1 of a file to the procedure application section 6. The procedure application section 6 passes the physical position location1 of a file to the file R/W section 5, and performs a read-out demand. The R/W section 5 performs read-out from the physical position location1 of a file, and returns a read-out result to the procedure application section 6. According to a procedure definition def1, the procedure application section 6 takes the necessary procedure to a read-out result, and returns the 2nd result to the communications department 1. The communications department 1 returns the 2nd result received from the procedure application section 6 to the claimant of read-out.

[0105]

[Effect of the Invention] The versatility [ resources / file ] of handling can be raised by enabling the access to the imagination file resources obtained as a result of applying a predetermined procedure to the existing file resources in the file system for dealing with the file resources distributed and arranged on a network according to this invention so that clearly from the above explanation. It can realize by matching and managing an imagination identifier and an imagination procedure, without actually generating imagination file resources and matching with a physical position at this time. By using the file system of this invention, it is effective in the ability to raise the versatility [ resources / file / of a network information system ] of handling.

[Translation done.]

• NOTICES •

The Japanese Patent Office is not responsible for any damages caused by the use of this translation.

1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. \*\*\*\* shows the word which can not be translated.
3. In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] In the file system in the network information system with which two or more computing systems which process information were connected with the network The physical position of the file resources which exist really in the above-mentioned computing system A virtual-file name management tool equipped with the virtual-file resource-management table which matches and carries out the 1 or more sets hold management of the virtual-file name which is the identifier of the procedure identifier which is a unit for processing the real file resources positional information and file resources which are shown, or the identifier of two or more procedures, and imagination file resources, A virtual-file name resolution means to search the above-mentioned real file resources positional information which receives the above-mentioned virtual-file name and becomes settled from the above-mentioned virtual-file name management tool corresponding to the above-mentioned virtual-file name, and the above-mentioned procedure identifier, The file system characterized by having a procedure application means to apply the procedure which becomes settled by the above-mentioned procedure identifier to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the above-mentioned virtual-file name acquired by the above-mentioned virtual-file name resolution means, and which exist really.

[Claim 2] In the file system in the network information system with which two or more computing systems which process information were connected with the network A file name management tool equipped with the file resource-management table which matches and carries out the 1 or more sets hold management of the real file resources positional information which shows the physical position of file resources which carries out the above-mentioned actual existence with the real file name which is the identifier of the file resources which exist really in the above-mentioned computing system, The virtual-file name which is the identifier of imagination file resources It considers as an input. file resources A conversion procedure management tool equipped with the virtual-file name correspondence table which carries out or more 1 hold management of the file name conversion procedure identifier which is the identifier of the file name conversion procedure which outputs a set of the procedure identifier which is a unit for processing, or the identifier of two or more procedures, a real file name, or a virtual-file name, As opposed to the virtual-file name to which the file name conversion procedure corresponding to the one or more above-mentioned file name conversion procedure identifiers of the above-mentioned conversion procedure management tool might be applied to the given virtual-file name A virtual-file name resolution means to output the above-mentioned procedure identifier obtained by the application of the above-mentioned real file resources positional information of the



above-mentioned file name management tool, and the above-mentioned file name conversion procedure corresponding to the real file name obtained while the one or more above-mentioned file name conversion procedures were applied recursively. The file system characterized by having a procedure application means to apply the procedure which becomes settled by the above-mentioned procedure identifier to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the above-mentioned virtual-file name acquired by this virtual-file name resolution means, and which exist really.

[Claim 3] A system-state acquisition means to acquire the parameter showing the status of a system, It has further a procedure selection means to choose one or more procedure identifiers from the procedure identifier of this plurality [ time / of obtaining two or more procedure identifiers corresponding to the virtual-file name which has the above-mentioned virtual-file name resolution means based on the above-mentioned parameter acquired with this system-state acquisition means ]. The above-mentioned virtual-file name resolution means outputs one or more above-mentioned procedure identifiers chosen with the above-mentioned real file resources positional information and the above-mentioned procedure selection means. the above-mentioned procedure application means By the above-mentioned virtual-file name resolution means Applying the procedure which becomes settled by the procedure identifier which is chosen with the above-mentioned procedure selection means to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the acquired above-mentioned virtual-file name, and which exist really, and is outputted from the above-mentioned virtual-file name resolution means The file system according to claim 1 or 2 by which it is characterized.

[Claim 4] It has further a procedure selection means to choose one or more procedure identifiers from two or more above-mentioned procedure identifiers based on the above-mentioned parameter when the parameter for choosing a procedure is received and the above-mentioned virtual-file name resolution means obtains two or more procedure identifiers corresponding to the above-mentioned virtual-file name. The above-mentioned virtual-file name resolution means outputs one or more above-mentioned procedure identifiers chosen with the above-mentioned real file resources positional information and the above-mentioned procedure selection means. the above-mentioned procedure application means By the above-mentioned virtual-file name resolution means Applying the procedure which becomes settled by the procedure identifier which is chosen with the above-mentioned procedure selection means to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the acquired above-mentioned virtual-file name, and which exist really, and is outputted from the above-mentioned virtual-file name resolution means The file system according to claim 1 or 2 by which it is characterized.

[Claim 5] An identifier analysis means to analyze the syntax of the inputted identifier, and a procedure management tool equipped with the procedure syntax management table which matches a predetermined token and one or more above-mentioned procedure identifiers, It has further a procedure selection means to use the above-mentioned procedure management tool on the basis of the token which appears to the syntax tree as a result of syntax analysis by the above-mentioned identifier analysis means, and to choose one or more above-mentioned procedure identifiers. The above-mentioned virtual-file name resolution means outputs one or more above-mentioned procedure identifiers chosen with the above-mentioned real file resources positional information and the above-mentioned procedure selection means. the above-mentioned procedure application means By the above-mentioned virtual-file name resolution means Applying the procedure which becomes settled by the procedure identifier which is chosen with the above-mentioned procedure selection means to the file resources which become settled by the above-mentioned real file resources positional information corresponding to the acquired above-mentioned virtual-file name, and which exist really, and is outputted from the above-mentioned virtual-file name resolution means The file system according to claim 1 or 2 by which it is characterized.

[Claim 6] Since the virtual-file resources to the above-mentioned virtual-file name are constituted from a unit corresponding to the virtual-file name acquired by the above-mentioned virtual-file name resolution means, two or more above-mentioned real file resources positional informations and a unit, or two or more above-mentioned procedure identifiers A formula generation means to generate the formula which consists of a required unit, two or more above-mentioned real file resources positional informations and a unit, or two or more above-mentioned procedure identifiers, A file system given in the claim 1 characterized by having a procedure application means to apply the procedure which becomes settled by the above-mentioned formula generated by this formula generation means, or any 1 term of 5.

[Translation done.]